

REPLACEMENT PARAGRAPHS

The apparatus that is used to arrange wrapped bakery products in predetermined patterns prior to the loading thereof into bakery trays is known as a pattern former. Typically, a pattern former receives ~~individual~~ individually wrapped bakery products from the wrapping apparatus, arranges the received wrapped bakery products in groups comprising between 1 and about 6 wrapped bakery products, assembles at least 2 and as many as several groups of wrapped bakery products relative to one another to form the predetermined pattern, then positions the entire pattern of wrapped bakery products in a bakery tray for transport.

More particularly, the pattern former of the present invention employs a vacuum turntable to receive groups of wrapped bakery products and to assemble the groups of wrapped bakery products into patterns. The use of the vacuum turntable of the present invention is advantageous in that by means thereof wrapped bakery products are received and accurately ~~position~~ positioned within predetermined patterns without damage either to the bakery products or the wrapping thereof.

The pattern former 100 further includes a transfer apparatus 110 which ~~transfer~~ transfers groups of wrapped bakery products from the grouping ~~conveyor~~ apparatus 108 onto a vacuum turntable 112. An important feature of the present invention comprises the fact that the transfer apparatus ~~100~~ 110 is adapted to transfer a first group of wrapped bakery products to the vacuum turntable 112 while a subsequent group of wrapped bakery products is being arranged on the grouping apparatus 108. The ability of the pattern former of the present invention to perform these two functions simultaneously comprises a significant improvement over the prior art which results in the pattern former of the present invention having a significantly improved throughput rate when compared with prior art pattern formers.

The upper surface of the turntable 112 which engages the wrapped bakery products comprises a perforated plate 132. The diameter of the perforations comprising the plate 132 is preferably between about .0337 inches and about .0340 inches. The spacing between the holes comprising the perforated plate 132 is preferably between about .2186 inches and about .2225 inches. The thickness of the perforated plate 132 is preferably about .020 inches, however, thicker plates can also be used in the practice of the invention, if desired. Those skilled in the art will appreciate and understand the fact that the precise dimensions comprising the diameters of the perforations, the spacing between perforations, and the thickness of the perforated plate 132 of the vacuum ~~table~~ turntable 112 can be varied in accordance with the requirements of particular applications of the invention.

The vacuum turntable 112 performs two very important functions in the operation of the pattern former 100. First, the vacuum turntable 112 decelerates individual wrapped bakery products comprising groups of wrapped bakery products which are moved onto the vacuum turntable 112 by the transfer apparatus 110. In this manner each wrapped bakery product ~~comprising~~ comprises a group thereof precisely positioned on the vacuum turntable 112 without danger of the wrapped bakery product moving beyond its intended location due to inertia. The vacuum turntable 112 also functions to firmly retain the wrapped bakery products received thereon during rotation of the vacuum turntable 112 to form the desired pattern of wrapped bakery products. This is true even if the wrapped bakery products are positioned near the outer circumference of the vacuum turntable 112. Perhaps most importantly, the vacuum turntable 112 properly decelerates wrapped bakery products received thereon and subsequently firmly retains the wrapped bakery products during rotation with no damage to the bakery products or the wrapping thereof.

The pusher plate ~~cam~~ cams 154 include pivotally supported sections 166. As the pusher plate 150 moves away from the turntable 112 and toward the motor 140, the cam followers 164 engage the pivotally supported portions 166 which thereupon pivot upwardly allowing the cam followers 164 to continue in engagement with the lower camming surfaces of the pusher plate cams 154.

When the pusher plate 150 reaches the end of its travel away from the turntable 112 and toward the motor 140, the direction of movement of the belt 136 is reversed and the pusher plate 150 is moved in the opposite direction, i.e., away from the motor 140 and toward the turntable 112. The cam followers 164 engage the pivotally supported portions 166 of the pusher plate cams 154 thereby causing the cam followers 164 to ride upwardly and into engagement with upper camming surfaces comprising the pressure pusher plate cams 154. Engagement of the cam followers 164 with the upper camming surfaces of the pusher plate cams 154 pivots the pusher plate 150 upwardly into an orientation in which it extends parallel to the pusher plate cams 154. This allows the pusher plate 150 to pass over a pattern of wrapped baked goods which has been assembled on the vacuum turntable 112 as the pusher plate 150 was moving a previously assembled pattern off the turntable 112 and into a bakery tray.



The spanker plate 152 is supported on rods 172 which are sidedly supported in the traveler 142. The rods 172 extend to a bar 174 which in turn extends to cam followers 176 which engage the spanker plate cams 156. As will be appreciated by those skilled in the art, the spanker plate cams 156 allow the spanker plate 152 to move downwardly as the traveler 142 reaches the limit of its travel in the direction extending away from the vacuum turntable 112 and towards the motor 140. As the traveler 142 begins its reverse movement, i.e., away from the motor ~~142~~ 140 and toward the vacuum turntable 112, the spanker plate cams 156 return the spanker plate 152 to the position illustrated in FIGURES 5-11, inclusive.

FIGURES 12-42, inclusive, depict the movement of the wrapped bakery products P away from the rotary vacuum turntable 112 and into the bakery tray T under the action of the pusher plate 150. As will be appreciated by those skilled in the art, the wrapped bakery products P follow a sliding movement downwardly along the upper surface of the slip sheet 180 as the wrapped bakery products P enter the bakery tray T.

Referring particularly to FIGURES 43-53, the movement of the wrapped bakery products P into the bakery tray T under the action of the pusher plate 150 eventually causes the bakery tray T to move away from the vacuum turntable 112 thereby disengaging the slip sheet 180 therefrom. FIGURES 48-53 illustrate the pivotally supported ~~portion~~ section 166 of the pusher plate cam 154 pivoting upwardly to allow the cam followers 164 to pass thereunder.

FIGURES 53-63, inclusive, illustrate the final portion of the movement of the wrapped bakery products P into the bakery tray T. The cam followers 176 eventually reach the end of the flat portions of the spanker plate cams 156 whereupon the spanker plate ~~142~~ 152 is allowed to move downwardly. As will be appreciated by those skilled in the art, the spanker plate ~~142~~ 152 is not forced downwardly, but instead moves downwardly under the action of gravity. The function of the spanker plate 152 is to assure that the last wrapped bakery product P comprising the pattern that was formed on the vacuum turntable 112 is fully seated in the bakery tray T. Simultaneously, the slip sheet 180 is fully disengaged from the bakery tray T as the bakery tray T moves away from the vacuum turntable 112 under the action of the pusher plate 150.

Upward movement of the spanker plate 152 and upward pivotal movement of the pusher plate 150 allow the pusher plate 150 and the spanker plate 152 to pass over a subsequent pattern of wrapped bakery products that was formed on the vacuum ~~table~~ turntable 112 as the pusher plate was moving the previously formed pattern of wrapped bakery products into the bakery tray T. The fact that a pattern of wrapped bakery products can be moved into a bakery tray and a subsequent pattern of wrapped bakery products can simultaneously be formed on the vacuum ~~table~~ turntable 112 comprises an important feature of the present invention which substantially increases the throughput rate of pattern formers incorporated in the invention.

Referring particularly to FIGURES 76-79, inclusive, when the cam followers 164 reach the ends of the upper surfaces of the pusher plates cams 154, the pusher plate 150 ~~drop~~ drops down under the action of gravity and returns to its original positioning. The spanker plate 152 remains in its raised orientation under the action of the engagement of the cam followers 176 with the spanker plate cams 156 ~~176~~. FIGURE 79 illustrates the component parts of the apparatus 116 in their original orientation and ready to move a subsequent pattern of wrapped bakery products into a bakery tray.

The transfer apparatus 110 which moves groups of wrapped bakery products from the grouping apparatus 108 to the vacuum ~~table~~ turntable 112 operates exactly the same as the transfer apparatus 116, the only difference being that the transfer apparatus 110 does not include a spanker plate. The transfer apparatus 110 includes a pusher plate 182 which is mounted on a belt driven traveler constructed similarly to and functioning identically to the traveler 142 and which is activated by cams constructed similarly to and functioning identically to the cams 154. Thus, the transfer apparatus 110 operates identically to the operation of the pusher plate 150 of the transfer apparatus 116 in that it is positioned in a downwardly extending, operative orientation as it moves groups of bakery products from the grouping apparatus 108 to the vacuum turntable 112, and is cammed upwardly into a horizontally disposed orientation as it moves in the reverse direction, that is, away from the vacuum turntable 112 and back toward the grouping apparatus 108. In this manner the pattern former of the present invention functions to arrange a subsequent group of wrapped bakery products on the grouping apparatus 108 as the pusher plate ~~181~~ 182 is moving a previous group of wrapped bakery products onto the ~~conveyor vacuum~~ turntable 112. The fact that the two operations occur simultaneously comprises an important feature of the pattern former 100 which substantially increases the throughput rate thereof.